

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
6 January 2005 (06.01.2005)

PCT

(10) International Publication Number
WO 2005/002060 A2

(51) International Patent Classification⁷: **H03M 7/30**

(21) International Application Number:
PCT/US2004/016585

(22) International Filing Date: 26 May 2004 (26.05.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/462,996 16 June 2003 (16.06.2003) US

(71) Applicant: **INTEL CORPORATION** [US/US]; 2200
Mission College Boulevard, Santa Clara, CA 95052 (US).

(72) Inventors: **ZIMMER, Vincent**; 1937 South 369th Street,
Federal Way, WA 98003 (US). **ROTHMAN, Michael**;
11905 183rd Street East, Puyallup, WA 98374 (US).
MILLER, Greg; 20505 NW Yoncalla Court, Portland,
OR 972291 (US). **DORAN, Mark**; 4605 33 rd Court NE,
Olympia, WA 98516 (US).

(74) Agents: **MALLIE, Michael, J. et al.**; Blakely Sokoloff
Tayor & Zafman, 12400 Wilshire Boulevard, 7th Floor, Los
Angeles, CA 90025 (US).

(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished
upon receipt of that report*

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: METHOD FOR FIRMWARE VARIABLE STORAGE WITH EAGER COMPRESSION, FAIL-SAFE EXTRACTION
AND RESTART TIME COMPRESSION SCAN

(57) Abstract: Firmware-based conversion methods for storing converted firmware variables in a firmware storage device, such as flash memory. Under one method, "eager" compression of firmware is performed. In response to a storage request, a determination is made to whether a compressor is available. If it is, the firmware variable is stored in a compressed form in the storage device; if not, the firmware variable is stored in an uncompressed form. In response to a read request for a stored firmware variable, a determination is made to whether the variable is stored in a compressed or uncompressed form. If it is compressed, a decompressor is employed to return the variable to its uncompressed form prior to providing it to the requestor; already uncompressed variables are provided directly to the requestor. An application program interface is provided to enable operating system runtime access to the firmware variables. Similar conversions may be employed separately or in parallel, including encryption.



WO 2005/002060 A2

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
6 January 2005 (06.01.2005)

PCT

(10) International Publication Number
WO 2005/002060 A3

(51) International Patent Classification⁷: **G06F 9/445,**
H03M 7/30

(21) International Application Number:
PCT/US2004/016585

(22) International Filing Date: 26 May 2004 (26.05.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/462,996 16 June 2003 (16.06.2003) US

(71) Applicant: **INTEL CORPORATION** [US/US]; 2200
Mission College Boulevard, Santa Clara, CA 95052 (US).

(72) Inventors: **ZIMMER, Vincent**; 1937 South 369th Street,
Federal Way, WA 98003 (US). **ROTHMAN, Michael**;
11905 183rd Street East, Puyallup, WA 98374 (US).

MILLER, Greg; 20505 NW Yoncalla Court, Portland,
OR 972291 (US). **DORAN, Mark**; 4605 33 rd Court NE,
Olympia, WA 98516 (US).

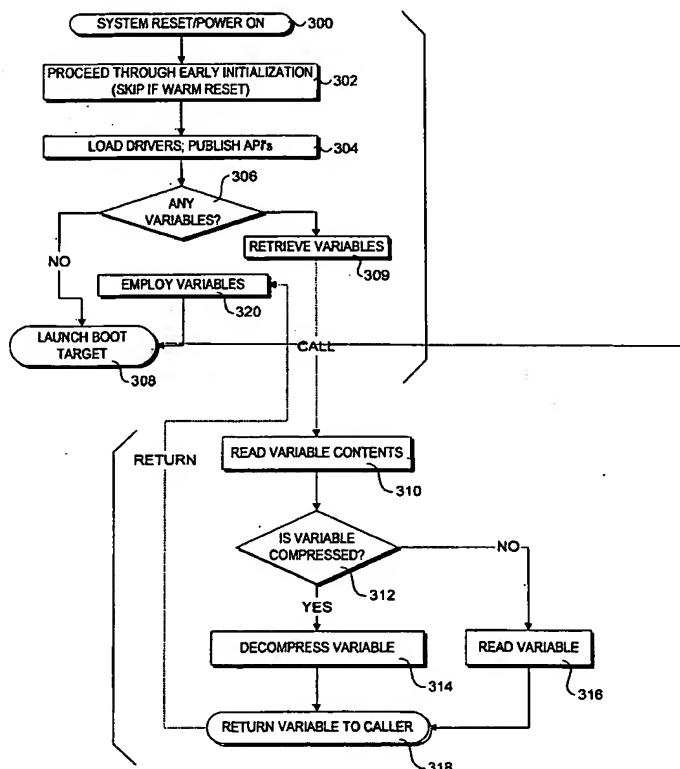
(74) Agents: **MALLIE, Michael, J.** et al.; Blakely Sokoloff
Taylor & Zafman, 12400 Wilshire Boulevard, 7th Floor, Los
Angeles, CA 90025 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,

[Continued on next page]

(54) Title: METHOD FOR FIRMWARE VARIABLE STORAGE WITH EAGER COMPRESSION, FAIL-SAFE EXTRACTION
AND RESTART TIME COMPRESSION SCAN



(57) Abstract: Firmware-based conversion methods for storing converted firmware variables in a firmware storage device, such as flash memory. Under one method, "eager" compression of firmware is performed. In response to a storage request, a determination is made to whether a compressor is available. If it is, the firmware variable is stored in a compressed form in the storage device; if not, the firmware variable is stored in an uncompressed form. In response to a read request for a stored firmware variable, a determination is made to whether the variable is stored in a compressed or uncompressed form. If it is compressed, a decompressor is employed to return the variable to its uncompressed form prior to providing it to the requestor; already uncompressed variables are provided directly to the requestor. An application program interface is provided to enable operating system runtime access to the firmware variables. Similar conversions may be employed separately or in parallel, including encryption.



GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) **Date of publication of the international search report:**
1 December 2005

Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.